

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:)	
)	Confirmation No.: 8706
George K. Phillips, et al.)	
)	Group Art Unit: 1774
Serial No.: 10/686,758)	
)	Examiner: Ferguson, Lawrence D.
Filed: October 15, 2003)	
)	
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PAPER)	

APPEAL BRIEF-CFR 41.37

Mail Stop Appeal Brief-Patents

Commissioner for Patents
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This Appeal Brief is being filed in furtherance of the Notice of Appeal, filed February 7, 2008. It contains the following items in the order indicated below as required by C.F.R. §41.37:

- I. Real Party in Interest
- II. Related Appeals and Interferences
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- VI. Grounds of Rejection to be Reviewed on Appeal
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I. Real Party in Interest

The real party in interest in this appeal is Verify First Technologies, Inc., a corporation organized under the laws of California.

II. Related Appeals and Interferences

There are no appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in this appeal.

III. Status of Claims

This application includes claims 1-49. Claims 2, 5, 7, 8, 12, 13, 21, 24, 26, 27, 30, and 31 have been cancelled, leaving claims 1, 3, 4, 6, 9-11, 14-20, 22, 23, 25, 28, 29, and 32-49 pending, all of which stand rejected. The claims on appeal are claims 1, 3, 4, 6, 9-11, 14-20, 22, 23, 25, 28, 29, and 32-49.

IV. Status of Amendments

All amendments have been entered.

V. Summary of Claimed Subject Matter

Although the invention should not be limited to the embodiments described in the specification, the invention will now be described in terms of several embodiments in order to aid in understanding the invention.

Independent claim 1 is directed to a copy resistant security sheet 10 (see page 8, lines 2-3; Fig. 1). The sheet 10 comprises a substrate 12 (see page 8, lines 6-12; Figs. 1 and 2), a light reflective layer 14 disposed over the substrate 12 (see page 9, lines 10-22; Figs. 1 and 2) and a light diffusive layer 16 disposed over at least a portion of the reflective layer 14 (see page 9, lines 23 to page 10, line 13; Figs. 1 and 2). The diffusive layer 16 has a diffusive background pattern 26 segmenting the reflective layer

14 into a reflective background pattern 28 comprising a plurality of visibly discernible reflective elements 32 (see page 10, lines 14-18; Figs. 1 and 2). When bearer information 22 is overprinted on the reflective and diffusive layers 14, 16, the reflective elements 32 are configured for interfering with the bearer information 22 on a copy of the document 20, thereby rendering the bearer information 22 unreadable on the document copy 20 (page 8, lines 4-6; page 10, lines 9-13; page 10 line 18 to page 11, line 2; Fig. 3).

Independent claim 15 is directed to a copy resistant document 20 (see page 8, lines 4-6; Fig. 3). The document 20 comprises a substrate 12 (see page 8, lines 6-12; Figs. 1 and 2), a light reflective layer 14 disposed over the substrate 12 (see page 9, lines 10-22; Figs. 1 and 2) and a light diffusive layer 16 disposed over at least a portion of the reflective layer 14 (see page 9, lines 23 to page 10, line 13; Figs. 1 and 2). The diffusive layer 16 has a diffusive background pattern 26 segmenting the reflective layer 14 into a reflective background pattern 28 comprising a plurality of visibly discernible reflective elements 32 (see page 10, lines 14-18; Figs. 1 and 2). The document 20 further comprises bearer information 22 overprinted on the reflective and diffusive layers 14, 16, wherein the reflective elements 32 interfere with the bearer information 22 on a copy of the document 20, thereby rendering the bearer information 22 unreadable on the document copy 20 (page 8, lines 4-6; page 10, lines 9-13; page 10 line 18 to page 11, line 2; Fig. 3).

Independent claim 20 is directed to a copy resistant security sheet 10 (see page 8, lines 2-3; Fig. 1). The sheet 10 comprises a substrate 12 (see page 8, lines 6-12; Figs. 1 and 2), a light reflective layer 14 disposed over the substrate 12 (see page 9, lines 10-22; Figs. 1 and 2) and a light diffusive layer 16 disposed over at least a portion

of the reflective layer 14 (see page 9, lines 23 to page 10, line 13; Figs. 1 and 2). The diffusive layer 16 has a non-black diffusive background pattern 26 segmenting the reflective layer 14 into a reflective background pattern 28 comprising a plurality of reflective elements 32 (see page 10, lines 6-9, 14-18; Figs. 1 and 2). When bearer information 22 is overprinted on the reflective and diffusive layers 14, 16, the reflective elements 32 are configured for interfering with the bearer information 22 on a copy of the document 20, thereby rendering the bearer information 22 unreadable on the document copy 20 (page 8, lines 4-6; page 10, lines 9-13; page 10 line 18 to page 11, line 2; Fig. 3).

Independent claim 33 is directed to a copy resistant document 20 (see page 8, lines 4-6; Fig. 3). The document 20 comprises a substrate 12 (see page 8, lines 6-12; Figs. 1 and 2), a light reflective layer 14 disposed over the substrate 12 (see page 9, lines 10-22; Figs. 1 and 2) and a light diffusive layer 16 disposed over at least a portion of the reflective layer 14 (see page 9, lines 23 to page 10, line 13; Figs. 1 and 2). The diffusive layer 16 has a non-black diffusive background pattern 26 segmenting the reflective layer 14 into a reflective background pattern 28 comprising a plurality of reflective elements 32 (see page 10, lines 6-9, 14-18; Figs. 1 and 2). The document 20 further comprises bearer information 22 overprinted on the reflective and diffusive layers 14, 16, wherein the reflective elements 32 interfere with the bearer information 22 on a copy of the document 20, thereby rendering the bearer information 22 unreadable on the document copy 20 (page 8, lines 4-6; page 10, lines 9-13; page 10 line 18 to page 11, line 2; Fig. 3).

VI. Grounds of Rejection to be Reviewed on Appeal

A) Whether claims 1, 3, 4, 9-11, 15-20, 22, 23, 28, 29, and 33-49 are unpatentable under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,772,248 ("Phillips").

B) Whether claims 6, 14, 25, and 32 are unpatentable under 35 U.S.C. §103(a) as being obvious over Phillips.

VII. Arguments

A. Rejection under 35 U.S.C. 102(b) over Phillips

Appellant respectfully submits that the Examiner erred in rejecting claims 1, 3, 4, 9-11, 15-20, 22, 23, 28, 29, and 33-49 under 35 U.S.C. §102(b) as being anticipated by Phillips. Notably, a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. (See MPEP §2131; Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)). As discussed below, Phillips does not disclose each and every element required by claims 1, 3, 4, 9-11, 15-20, 22, 23, 28, 29, and 33-49.

1. Claims 1, 3, 4, 15-17, 20, 22, 23, and 33-35, 38, 41, 44, and 47

The claimed invention is directed to a copy-resistant document that prevents bearer information that is overprinted on the document to be unreadable on a copy of the document. In contrast, Phillips is directed to a tamper and counterfeit resistant document that includes a latent message that only appears on the original document when the document is viewed at a specific angle. Noticeably missing in Phillips is any disclosure that bearer information that is overprinted on the original document is rendered unreadable on a copy of the document.

The Examiner has concluded that the latent message 14 that is formed by the image structure 18 on the overlay marker 10 in Phillips is the bearer information itself (see page 3, lines 5-6 of Final Office Action, dated October 18, 2007). Even assuming that this latent message 14 can be considered the claimed "bearer information," Phillips would still not anticipate claims for several reasons.

In particular, independent claims 1, 15, 20, and 33 require the bearer information to be overprinted on the reflective and diffusive layers (in the case of Phillips, the reflective and diffusive layers would apparently be the image structure 18 and raised markings 16, respectively). However, the latent message 14 (assuming that it is the claimed bearer information) is not, and cannot logically be, overprinted on the image structure 18 and raised markings 16, since the latent message is optically formed by the contrast between the image structure 18 and raised markings 16 (see col. 4, lines 51-56). In fact, Phillips discusses in great detail the physics behind the optical formation of the latent image 14 by using the contrast between the image structure 18 and relief background structure 15 (see col. 4, line 61 to col. 5, line 38).

Thus, because the latent message 14 cannot logically be overprinted on itself, it must be overprinted on something else. Thus, to the extent that the latent message 14 can be considered to be overprinted on something else, it is overprinted on the substrate 11—not the image structure 18 and raised markings 16 that actually forms the latent message 14.

Despite the clear disclosure in Phillips that the latent image 14 (as the alleged bearer information) is optically formed, and the fact that nowhere does Phillips disclose that the latent image 14 is ever printed over the image structure 18 and relief background structure 15, the Examiner has maintained otherwise.

Notably, in a telephonic interview conducted between the Examiner and Appellant on January 24, 2008, the Examiner pointed to a statement made in Phillips that the image relief pattern 14 is imprinted on the security overlay marker 10 (see col. 3, line 61-62) to support the conclusion that the latent image 14 is printed over the relief image structure 18 and relief background structure 15. However, this statement does not mean that the latent image 14 is printed over the relief image structure 18 and relief background structure 15.

Reading the language "image relief pattern 14" in the context of the entire prior art reference, which the Examiner is required to do, it is clear that this statement means that the relief structure that forms the latent image 14 (i.e., the relief image structure 18 and the relief background structure 15) is overprinted on the overlay marker 10—not the relief image structure 18 and the relief background structure 15. In fact, Phillips clearly discloses that the latent image 14 is actually created by the relief image structure 18 and the relief background structure 15 (see col. 3, line 67 to col. 4, line 22), and thus, it is the relief image structure 18 and the relief background structure 15 that are overprinted onto the overlay marker 10 to form the latent image 14 (or image relief pattern 14). Therefore, to the extent that the latent image 14 is overprinted on anything, it is overprinted on the bare overlay marker 10, which does not have a relief image structure 18 and relief background structure 15 before the printing of the latent image 14 (and thus, cannot be overprinted onto a relief image structure and relief background structure that does not yet exist).

In addition, independent claims 1, 15, 20, and 33 further require the bearer information to be unreadable on a copy of the document. The Examiner has concluded that the latent message 14 of Phillips (as the alleged bearer information) would

inherently be unreadable on a document copy (see page 3, lines 5-6 of the Final Office Action). However, the Examiner has not shown how this could be. The MPEP provides:

The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient. "In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." (See MPEP §2112.IV) (emphasis in original)(citations omitted).

The Examiner has not shown that the latent message 14 incorporated into the original document 12 of Phillips would necessarily be unreadable on a copy of the document 12. Although the latent message 14 is not readable when viewing the document 12 at a perpendicular angle, and copy machines view documents at a perpendicular angle during the copying function, this does not mean that the latent message 14 will not appear on a copy of the document, since the human eye/brain operate in a different manner than copy machines. In fact, the reflectance exhibited by the latent message 14 of the original document 12 would actually cause the latent message 14 to turn black on a document copy at any angle (see col. 4, lines 1-6 of U.S. Patent No. 5,704,651, which describes reflective elements that turn black on a document copy that blend in with a camouflaging background pattern to actually cause information to be unreadable on the document copy), thereby resulting in a clearly readable message when contrasted with the image of the markings 16 on the document copy.

Despite evidence to the contrary, the Examiner stated:

The latent image (14) would be unreadable on a document copy as a result of the image (14) only being visible when viewed at a certain angle. If the image can be only be viewed at a certain angle and most copiers do not copy at an angle, the image would not appear on a copy as it would appear at eh viewing angles 20° to 70° (see lines 14-16 of Advisory Action, dated December 11, 2007).

However, as stated above, a human eye/brain operates in a different manner from copy machines, and thus, the fact that a human cannot view an image at a perpendicular angle, does not mean that the image will not appear on a copy machine that copies the image at a perpendicular. In fact, as discussed above, the reflectance from latent image 14 would cause the latent image 14 to turn black on a copy (as evidenced in col. 4, lines 1-6 of U.S. Patent No. 5,704,651), and thus, would be visible on the copy.

The Examiner concluded that even if the latent image 14 would turn black on a document copy, it would blend with the camouflage pattern, and thus be unreadable (see lines 18-20 of Advisory Action). However, there is no express or inherent disclosure in Phillips that the relief markings would exhibit itself as some kind of camouflage background that renders the blackened latent image 14 unreadable. Indeed, the relief markings, themselves, would have to turn black on the document copy in order to render the latent image 14 unreadable. There is no such disclosure in Phillips, and the Examiner has not shown otherwise.

Because each of independent claims 1, 15, 20, and 33 requires bearer information to be overprinted on or over reflective and diffusive layers, and that such bearer information be rendered unreadable on a document copy, and Phillips does not disclose these features, Appellant believes that the Examiner has not established a prima facie case that these independent claims, as well as the claims depending

therefrom (claims 1, 3, 4, 16, 17, 22, 23, and 34, 35, 38, 41, 44, and 47), are anticipated by Phillips under 35 U.S.C. §102.

2. Claims 9, 10, 18, 19, 28, 36, and 37

Furthermore, claims 9, 18, and 36 require the diffusive background pattern to be non-black, and claims 10, 19, 28, and 37 require the diffusive background pattern to be white.

Notably, the contrasting colors between the bearer information and the diffusive background pattern provide greater contrast for the bearer information, thereby allowing the bearer information to be more easily distinguished from the diffusive background pattern, and thus, more readable on the original of the document (see paragraph [00013] of the specification). In contrast, the Examiner has not shown that the relief markings 16 disclosed in Phillips are non-black or white.

While the Examiner does conclude that the relief markings 16 are white based on their depiction as being white in Fig. 5 of Phillips, it is shown this way due to the PTO's requirement that embodiments be illustrated with line drawings. That is, the relief markings 16 are depicted as being white because the color of the paper on which the Phillips patent is printed is white. Notably, if the Phillips patent were to be printed on psychedelic paper, it would be complete nonsense to conclude that Phillips therefore discloses psychedelic relief markings 16.

Because claims 9, 10, 18, 19, 28, 36, and 37 require the diffusive background pattern to be non-black or white, and Phillips does not disclose these features, Appellant believes that the Examiner has not established a prima facie case that these claims are anticipated by Phillips under 35 U.S.C. §102.

3. Claims 11 and 29

Furthermore, claims 11 and 29 require that at least a portion of the diffusive background pattern be composed of a plurality of nano-characters. The Examiner concluded that Figure 5 shows the relief markings 16 as a plurality of nano-characters. However, Figure 5 does not show the relief markings 16 as being nano-characters or any character—it discloses the relief markings 16 as being relief markings.

Because claims 11 and 29 require at least a portion of the diffusive background pattern to be composed of a plurality of nano-characters, and Phillips does not disclose this feature, Appellant believes that the Examiner has not established a prima facie case that these claims are anticipated by Phillips under 35 U.S.C. §102.

4. Claims 39, 42, 45, and 48

Furthermore, claims 39, 42, 45, and 48 require the reflective elements to be configured for allowing bearer information to be readable on an original of the document at any viewing angle. The Examiner concluded that because these claims recite “capable of” language, they do not recite positive limitations. Essentially, the Examiner has concluded that the “capable of” limitations recited by these claims are “intended use” limitations. Appellant is fully aware that an “intended use” limitation has no patentable weight. However, the limitations recited in claims 39, 42, 45, and 48 are not intended use limitations, but rather functional limitations that must be given patentable weight.

The Patent Office has stated:

A functional limitation is an attempt to define something by what it does, rather than by what it is (e.g., as evidenced by its specific structure or specific ingredients). There is nothing inherently wrong with defining some part of an invention in functional terms. Functional language does not, in and of itself, render a claim improper.

* * *

A functional limitation must be evaluated and considered, just like any other limitation of the claim, for what it fairly conveys to a person of ordinary skill in the pertinent art in the context in which it is used. A functional limitation is often used in association with an element, ingredient, or step of a process to define a particular capability or purpose that is served by the recited element, ingredient or step. M.P.E.P. § 2173.05(g).

The limitations recited in claims 39, 42, 45, and 48 are proper functional limitations and not intended use. Phillips simply does not disclose that the reflective elements 18 are configured for allowing the latent message 14 (as the bearer information) to be readable on an original of the document 12 at any viewing angle, and in fact, is specifically designed such that the latent message 14 is only readable on the original of the document 12 at an oblique angle.

The Examiner maintains that the phrase “for allowing the bearer information to be readable on an original document” constitutes a “capable of” limitation and that such a recitation that an element is “capable of” performing a function is not a positive limitation but only requires the ability to so perform (see lines 21-24 of Advisory Action). Appellant understands that these claims recite “functional” or “capable of” language. However, the Examiner has not shown that the latent message 14 (as the bearer information) is capable of being readable on an original of the document at any viewing angle. In fact, as discussed above, the latent message 14 can only be read at oblique angles.

Because claims 39, 42, 45, and 48 require the reflective elements to be configured for allowing bearer information to be readable on an original of the document at any viewing angle, and Phillips does not disclose this feature, Applicant believes that the Examiner has not established a prima facie case that these claims are anticipated by Phillips under 35 U.S.C. §102.

5. Claims 40, 43, 46, and 49

Furthermore, claims 40, 43, 46, and 49 require that the bearer information be overprinted using toner or ink. The Examiner concluded that "Phillips discloses the overlay marker comprises ink or toner receptive material" (see page 3, lines 4-5 of Final Office Action). Although it may be true that Phillips does disclose this, and thus, bearer information can be overprinted on the overlay marker 10, this is not the same bearer information that the Examiner initially characterized as the latent message 14. If the Examiner now believes that the bearer information is not the latent message 14, but is rather is toner or ink that is overprinted on the overlay marker 10, there is no explicit or implicit disclosure in Phillips that the image of the toner or ink on a copy of the document 12 is unreadable.

Because claims 40, 43, 46, and 49 require the bearer information to be overprinted using toner or ink, and Phillips does not disclose this feature, Applicant believes that the Examiner has not established a prima facie case that these claims are anticipated by Phillips under 35 U.S.C. §102.

B. Rejection under 35 U.S.C. 103(a) over Phillips

Appellant respectfully submits that the Examiner erred in rejecting claims 6, 14, 25, and 32 under 35 U.S.C. §103(a) as being obvious over Phillips. To establish obviousness, it must be found that the differences between the claimed invention and the prior art would have been obvious to a person having ordinary skill in the art.

Graham v. John Deere Co., 383 U.S. 1, 17 (1966).

The differences between claims 6, 14, 25, and 32 and the teachings of Phillips would not have been obvious to a person having ordinary skill in the art. In particular, as discussed above, Phillips does not disclose bearer information overprinted on the

reflective and diffusive layers, and that such bearer information be unreadable on a copy of the document, as required by independent claims 1, 15, 20, and 33 from which these claims respectively depend, and there is no teaching or suggestion in Phillips to somehow incorporate these features into the document of Phillips.

Thus, Applicant believes that the Examiner has not established a prima facie case that these claims are obvious over Phillips under 35 U.S.C. §103.

Respectfully submitted,

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VIII. Appendix of Claims Involved in the Appeal

1. A copy-resistant security sheet, comprising:

a substrate;

a light reflective layer disposed over the substrate; and

a light diffusive layer disposed over at least a portion of the reflective layer, the diffusive layer having a diffusive background pattern segmenting the reflective layer into a reflective background pattern comprising a plurality of visibly discernible reflective elements;

wherein, when bearer information is overprinted on the reflective and diffusive layers, the reflective elements are configured for interfering with the bearer information on a copy of the document, thereby rendering the bearer information unreadable on the document copy.

3. The security sheet of claim 1, wherein the reflective layer is composed of metal.

4. The security sheet of claim 1, wherein the reflective layer exhibits a reflectance of at least eighty percent.

6. The security sheet of claim 1, wherein the reflective layer is disposed over the entirety of the substrate.

9. The security sheet of claim 1, wherein the diffusive background pattern is non-black.

10. The security sheet of claim 1, wherein the diffusive background pattern is white.

11. The security sheet of claim 1, wherein at least a portion of the diffusive background pattern is composed of a plurality of nano-characters.

14. The security sheet of claim 1, wherein the reflective elements have at least a 6 point font size.

15. A copy-resistant document, comprising:

a substrate;

a light reflective layer disposed over the substrate;

a light diffusive layer disposed over at least a portion of the reflective layer, the diffusive layer having a diffusive background pattern segmenting the reflective layer into a reflective background pattern comprising a plurality of visibly discernible reflective elements; and

bearer information overprinted on the reflective and diffusive layers, wherein the reflective elements interfere with the bearer information on a copy of the document, thereby rendering the bearer information unreadable on the document copy.

16. The document of claim 15, wherein the bearer information comprises alphanumerical characters.

17. The document of claim 16, wherein the alphanumerical characters and the reflective elements have a substantially similar font size.

18. The document of claim 15, wherein the bearer information is black, and the diffusive background pattern is non-black.

19. The document of claim 18, wherein the diffusive background pattern is white.

20. A copy-resistant security sheet, comprising:

a substrate;

a light reflective layer disposed over the substrate; and

a light diffusive layer disposed over at least a portion of the reflective layer, the diffusive layer having a non-black diffusive background pattern segmenting the reflective layer into a reflective background pattern comprising a plurality of reflective elements;

wherein, when bearer information is overprinted on the reflective and diffusive layers, the reflective elements are configured for interfering with the bearer information on a copy of the document, thereby rendering the bearer information unreadable on the document copy.

22. The security sheet of claim 20, wherein the reflective layer is composed of metal.

23. The security sheet of claim 20, wherein the reflective layer exhibits a reflectance of at least eighty percent.

25. The security sheet of claim 20, wherein the reflective layer is disposed over the entirety of the substrate.

28. The security sheet of claim 20, wherein the diffusive background pattern is white.

29. The security sheet of claim 20, wherein at least a portion of the diffusive background pattern is composed of a plurality of nano-characters.

32. The security sheet of claim 20, wherein the reflective elements have at least a 6 point font size.

33. A copy-resistant document, comprising:

a substrate;

a light reflective layer disposed over the substrate;

a light diffusive layer disposed over at least a portion of the reflective layer, the diffusive layer having a non-black diffusive background pattern segmenting the reflective layer into a reflective background pattern comprising a plurality of reflective elements; and

bearer information overprinted over the reflective and diffusive layers, wherein the reflective elements interfere with the bearer information on a copy of the document, thereby rendering the bearer information unreadable on the document copy.

34. The document of claim 33, wherein the bearer information comprises alphanumerical characters.

35. The document of claim 34, wherein the alphanumerical characters and the reflective elements have a substantially similar font size.

36. The document of claim 33, wherein the bearer information is black, and the diffusive background pattern is non-black.

37. The document of claim 36, wherein the diffusive background pattern is white.

38. The document of claim 1, wherein the reflective elements are configured for allowing the bearer information to be readable on an original of the document.

39. The document of claim 38, wherein the reflective elements are configured for allowing the bearer information to be readable on an original of the document at any viewing angle.

40. The document of claim 1, wherein, when bearer information is overprinted on the reflective and diffusive layers using toner or ink, the reflective elements are configured for interfering with the bearer information on the document copy, thereby rendering the bearer information unreadable on the document copy.

41. The document of claim 15, wherein the reflective elements are configured for allowing the bearer information to be readable on an original of the document.

42. The document of claim 41, wherein the reflective elements are configured for allowing the bearer information to be readable on an original of the document at any viewing angle.

43. The document of claim 15, wherein the bearer information is overprinted on the reflective and diffusive layers using toner or ink.

44. The document of claim 20, wherein the reflective elements are configured for allowing the bearer information to be readable on an original of the document.

45. The document of claim 44, wherein the reflective elements are configured for allowing the bearer information to be readable on an original of the document at any viewing angle.

46. The document of claim 20, wherein, when bearer information is overprinted on the reflective and diffusive layers using toner or ink, the reflective elements are configured for interfering with the bearer information on the document copy, thereby rendering the bearer information unreadable on the document copy.

47. The document of claim 33, wherein the reflective elements are configured for allowing the bearer information to be readable on an original of the document.

48. The document of claim 47, wherein the reflective elements are configured for allowing the bearer information to be readable on an original of the document at any viewing angle.

49. The document of claim 33, wherein the bearer information is overprinted on the reflective and diffusive layers using toner or ink.

IX. Evidence Appendix

U.S. Patent No. 5,772,248. Originally cited by Appellant in the Information Disclosure Statement, dated January 15, 2004.

X. Related Proceedings Appendix

None.



US005772248A

United States Patent [19]

Phillips

[11] Patent Number: 5,772,248

[45] Date of Patent: Jun. 30, 1998

[54] DOCUMENT WITH TAMPER AND COUNTERFEIT RESISTANT RELIEF MARKINGS

[75] Inventor: George K. Phillips, Paso Robles, Calif.

[73] Assignee: Verify First Technologies, Inc., Paso Robles, Calif.

[21] Appl. No.: 568,587

[22] Filed: Dec. 7, 1995

[51] Int. Cl.⁴ B42D 15/00

[52] U.S. Cl. 285/91; 283/72

[58] Field of Search 283/93, 94, 91, 105, 57-59, 901-904, 61, 62, 281/2, 5; 40/446, 453, 299; 428/43

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McGarry, Dennis, "Document Security", *Technical Update-National Business Forms Association*, Dec. 1, 1990, pp. 3-8.National Business forms Association, "Watermarked and Non-Impact Papers", *Technical Report*, Aug. 17, 1987, vol. 1, No. 8, T.U. #32 (LLB), pp. 1-3.The Standard Registry Company, "Making It Easy for People to Be Honest—Three Steps to Document Security", *Standard Register*, Form No. 5463 4.89-1, 1990, pp. 1-6.McLoone, Sharon, "Inks That Are Mightier Than the Counterfeiter", *Form*, May 1995, pp. 88, 90, 93.Steven S. Scaman et al., "Security Indicator Inks Gain Market Prominence", *Flexo*, Dec. 1994, pp. 14, 16-17.

Primary Examiner—Willmon Fridie, Jr.

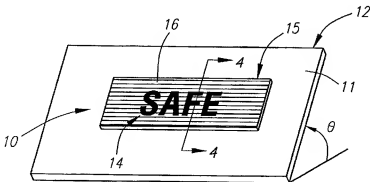
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[57]

ABSTRACT

A tamper and counterfeit resistant security maker comprises relief impressions having a plurality of distinct and contrasting relief structures, wherein a first relief structure comprises a background pattern and at least a second relief structure comprises a latent image pattern containing informational content. The relief patterns comprise different optical properties which facilitates the viewing of a latent image pattern at certain angles.

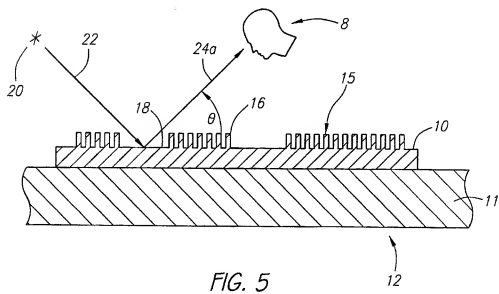
9 Claims, 3 Drawing Sheets



U.S. PATENT DOCUMENTS

5,029,901	7/1991	Dolson et al.	462/8	5,190,318	3/1993	Mantegazza	283/82
5,044,707	9/1991	Malik	359/2	5,197,765	3/1993	Mowry, Jr. et al.	283/93
5,093,184	3/1992	Edwards	428/192	5,271,645	12/1993	Wicker	283/92
5,137,304	8/1992	Silvershotz	283/100	5,344,192	9/1994	Phillips	283/91
5,149,140	9/1992	Mowry, Jr. et al.	283/93	5,454,598	10/1995	Wicker	283/67
				5,582,103	12/1996	Takana et al.	283/91

FIG. 3



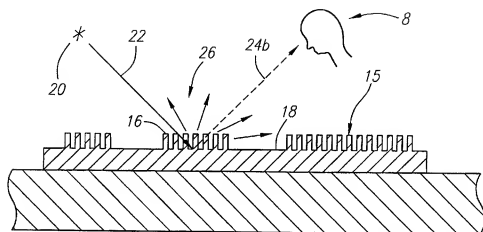


FIG. 6

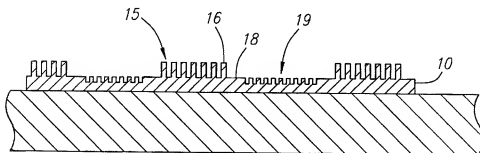


FIG. 7

DOCUMENT WITH TAMPER AND COUNTERFEIT RESISTANT RELIEF MARKINGS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The field of the invention pertains to the detection of the unauthorized alteration, duplicating or counterfeiting of valuable documents. In particular, the field of the present invention pertains to the imprinting of original documents so that an alteration or reproduction of the document is readily discernable from the original document.

2. The Related Art

Presently known approaches for recognizing altered, duplicate or counterfeit copies of original documents have generally sought to prevent alteration, duplication or counterfeiting of documents by physical alteration, electronic scanning or xerographic photocopying by printing information on the document in specially designed inks or other printing materials so that the printed information can be viewed on the original, but due to the unique color, texture, or reflective properties of the printed information on the altered or counterfeited copy, will be readily discernable from the original.

For example, U.S. Pat. No. 4,066,280 to LaCapria describes a document upon which is printed a specularly reflective coloring material such as powdered aluminum, which is not accurately reproduced by color copiers. The duplicate image will appear in different colors than on the original.

Similarly, U.S. Pat. No. 4,988,126 to Heckenkamp et al. describes an original document having surface relief in the form of embossed characters. A luminescent substance is formed into raised or depressed areas of the surface relief. The reflective properties of the surface relief render the original readily discernable from a photocopy which lacks the surface relief.

U.S. Pat. No. 4,082,426 describes retroreflective sheet materials formed of a monolayer of microsphere-lenses overlaying a specularly reflective layer coated over a polymeric material. A transparent image layer of varying thickness permits light rays to be transmitted to and reflected by the specularly reflective layer behind the image layer. The varying thickness of the image layer and the microsphere-lenses changes the reflective characteristics of the sheeting, so that markings on the sheet are visible only from certain angles under retroreflective viewing conditions.

U.S. Pat. No. 4,892,385 to Webster, Jr. et al. describes an authenticating device which can be bonded to the surface of a document to identify an original document.

Another approach has been to provide specially manufactured copy-resistant paper upon which information of any kind can be printed using conventional processes and inks. For example, U.S. Pat. No. 4,867,481 to Gundjian describes copy-resistant paper having a two-color grid-like pattern printed over its surface, with each color having the same spectral profile but different spectral response. U.S. Pat. No. 4,303,307 to Turek et al. describes a paper substrate coated with specially sized and spaced beads which break up incident light emitted by a photocopy. U.S. Pat. No. 5,093,184 to Edwards describes security paper having elongated metallic elements embedded in the paper.

Yet another approach has been to provide specially designed inks or other printing materials having different or

unique color or reflective properties. For example, U.S. Pat. No. 5,271,645 to Wicker describes a color-copier resistant pigment consisting of print stuff mixtures obtained by mixing commercially available pigments with fluorescence compound.

U.S. Pat. No. 4,869,532 to Abe et al. describes a print produced by printing or coating an infrared reflective coloring agent and another printing ink containing an infrared absorptive coloring agent in combination on a base material, to produce visually-recognizable information along with other information recognizable with the aid of infrared lighting.

U.S. Pat. No. 4,025,673 and U.S. Pat. No. 3,887,742 to Reinagel describe prevention of photocopying by selection of different color or color filter combinations for the text and background.

U.S. Pat. No. 4,175,776 to Ranauro describes a document in which the text and background are characterized by different optical reflectivities for incident visible light and which are substantially non-absorbing with respect to incident light having wavelengths within the response spectrum of color xerographic copying machines. When the document is photocopied, the incident light of the photocopy produces a uniform reflected pattern over the indicia which causes the indicia to "drop out" of the copy.

U.S. Pat. No. 4,522,429 to Gardner et al. discloses a document upon which text is printed upon colored paper having a reflection spectral response of less than about ten percent for light of below 600 millimicron wavelength, so that the color is sufficiently contrasting with the text to be visible when viewed under white light, but cannot be successfully photocopied.

SUMMARY OF THE INVENTION

The present invention provides an advantageous approach to the prevention and detection of alteration, duplication or counterfeiting by providing a tamper resistant document marker which can be readily visually identified on an original document, but which cannot be exactly duplicated by commercially available document copier devices.

The present invention comprises a pattern of relief impressions on a document having a plurality of distinct and contrasting relief structures, which forms a visible image when observed at the correct viewing angle(s), but which is "hidden" when observed at an incorrect viewing angle. In the preferred embodiment, a latent image is formed by the contrasting optical properties of an image relief structure which is contrasted to the optical properties of a background relief structure. The contrasting image relief structure becomes visible against the background relief structure when observed at the proper viewing angles. The image relief structure can be fabricated as a series of alpha-numeric characters to provide informational content to the contrasting visible image.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

FIG. 1 is a top view of a counterfeit-resistant document according to a preferred embodiment of the present invention.

FIG. 2 is a diagram of alternative viewing angles for an embodiment of the present invention.

FIG. 3 shows the document of FIG. 1 viewed from an angle θ .

FIG. 4 is a cross-sectional view of a counterfeit-resistant document having a security tamper resistant overlay marker according to a preferred embodiment of the present invention.

FIGS. 5 and 6 show the interaction of incident and reflective light rays on the security tamper resistant overlay marker of FIG. 4.

FIG. 7 is a cross-sectional view of a two image security tamper resistant overlay marker according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 depicts the invention as preferably used to create a tamper/counterfeit-resistant document 12 comprising a substrate 11 and a security tamper resistant overlay marker 10 according to a preferred embodiment of the present invention. The substrate 11 is preferably of paper stock; however, any material suitable to the application may be used without departing from the scope of the present invention. It is anticipated that the present invention will be particularly suitable for checks and other documents of value, although the present invention is not limited to these applications and can be used in any application in which it is desirable to be able to discern an original from an alteration or reproduction.

Security tamper resistant overlay marker 10 is preferably formed of at least one layer of tamper resistant reflective material of uniform height which is applied to substrate 11. Materials, such as materials with optical variable metallic property or plastic or polymeric materials, may be employed depending on the particular application without deviating from the scope of the present invention. The security tamper resistant overlay marker 10 is preferably comprised of tamper resistant material which is either opaque, metallic, translucent or transparent. To provide an increase in reflectivity, the surface of security overlay marker 10 is preferably coated with a glossy plastic film or an optical variable reflective metallic coating, which may also serve to protect the surface of security overlay marker 10 from wear or damage. Preferably the security overlay marker 10 is comprised of pre-formed sheets of overlay marker material which are affixed to substrate 11 with adhesives.

As outlined in phantom in FIG. 1, the surface of security overlay marker 10 comprises relief impressions which form a latent image 14, shown in FIG. 1 as the alphanumeric characters "SAFE". The image 14 is not readily apparent when an observer 13 is viewing the document 12 at an angle approximately perpendicular to the surface of the document 12. In the preferred embodiment, the latent image 14 is thus "hidden" when an observer's viewing angle is at an angle of approximately 90 degrees relative to the surface of security tamper resistant overlay marker 10 (FIG. 2). The latent image 14 becomes "visible", i.e., more readily apparent, when the viewing angle is in the range of approximately 0° to 90° relative to the surface of the security overlay marker 10. Angle θ is preferably less than 90°, and more preferably comprises a range of viewing angles from approximately 20° to 70° at which the image 14 is more readily apparent. Factors which determine this range of viewing angles include the exact viewing conditions, the material comprising security overlay marker 10, the wavelengths of the incident light rays, the incoming angle of the incident light rays, and the image relief pattern 14 imprinted on the security overlay marker 10.

FIG. 3 depicts the document 12 and security tamper resistant overlay marker 10 of FIG. 1 according to a preferred embodiment, which has been rotated to an angle θ , showing a latent image 14 visible against a contrasting background pattern. In this preferred embodiment, security

tamper resistant overlay marker 10 comprises a relief impression having at least two distinct and contrasting relief structures. The first relief structure is a background structure 15 which generally extends over a substantial portion of the surface of security tamper resistant overlay marker 10. The second relief structure is a contrasting image structure 18 which is generally formed within the boundaries of the background structure 15 to provide informational content to the security overlay marker 10. In the preferred embodiment, the latent image 14 comprises a series of relief impressions having a rectilinear background structure 15 forming the background pattern, with a contrasting image structure 18 forming a series of alphanumeric image patterns which combine to form a document verification word such as "SAFE" or "GENUINE". It is within the scope of the present invention to employ non-alphanumeric image patterns to provide the informational content of latent image 14, i.e. pictorial impressions or numeric impressions. A plurality of contrasting or different image relief structures may be employed in the present invention, each of which may be viewable at different observable viewing angles than a first image relief structure.

FIG. 4 is a cross-sectional view of the security tamper resistant overlay marker 10 of FIG. 3 at line A—A, showing the general relief structure of latent image 14. Background structure 15 is preferably formed by a series of parallel raised markings 16 which extend the length of security tamper resistant overlay marker 10 except in the portions in which the contrasting image structure 18 resides. Each marking 16 preferably comprises a generally uniform height H1 and width W and spacing S. Because of the surface structure formed by raised markings 16, incident light rays which are projected onto the markings 16 are reflected and modified by a diffractive and/or diffusional process. The height, width, and spacing of the markings 16 in FIG. 4 are for purposes of illustration only; the actual dimensions of the relief structure of security tamper resistant overlay marker 10 are chosen to bring about desired optical effects on incident light rays which strike the security tamper resistant overlay marker 10, as explained in more detail below. It is contemplated that other background patterns may be employed in the present invention in place of the described rectilinear background pattern, and these other background patterns are expressly within the scope of the present invention.

The latent image 14 is preferably formed on the surface of overlay marker 10 with image structure 18 of height H2 whose borders are in the shape of the desired image. Image structure 18 is comparatively smooth with a light-reflecting surface having surface irregularities which are preferably small in comparison to the wavelength of visible light. It is the contrast between the optical properties of image structure 18 and the optical properties created by the raised markings 16 that creates the latent image 14 and which renders the latent image 14 visible when document 12 is viewed at angle θ .

As shown in FIGS. 5 and 6, an observer 8 would typically view the security tamper resistant overlay marker 10 at a relative angle θ , with a light source 20 projecting incident light rays 22 at security tamper resistant overlay marker 10.

With respect to incident light rays 22 which project onto image structure 18 (FIG. 5), the reflected light rays 24a are preferably without significant diffractive effects to the amplitude or phase of the incident light, as compared to the reflected light rays 24b (FIG. 6) from the background structure 15. In addition, light rays 24a more specularly reflect to observer 8, as compared to light rays 24b reflected

from background structure 15, because the relative smoothness of image structure 18 causes less diffusion of the incident light rays 22.

With respect to incident light rays 22 which project onto the background structure 15 (FIG. 6), the reflected light rays 24b are reflected to observer 8 with a character different than that of reflected light rays 24a from image structure 18. In general, two types of light modifications may occur when the incident light rays 22 are projected onto the raised markings 16 of the background structure 15. First, the height and spacing of the raised markings 16 may be such that a diffractive interference pattern is formed wherein the amplitude and/or wavelength of incident light rays 22 are modified in the reflected light rays 24b. The diffractive effects can be controlled by modifying the spacing S, width W, and height H1 of the raised markings 16 to produce reflected light rays 24b containing desired optical characteristics. Second, the surface irregularities formed by the raised markings 16 may diffuse the incident light rays 22, such that certain incident light rays 22 which strike the raised markings 16 will scatter, reflecting light rays 26 at angles not directed towards observer 8. The optical effect of this diffusion of light rays allows the rectilinear pattern of the background structure 15 to be clearly visible at the proper viewing angles.

The latent image 14 is thus readily visible at angle θ because of the stark contrast between the intensity and character of the reflected light rays 24a of image structure 18 and the reflected light rays 24b of the background structure 15. The contrast between the image structure 15 and the background structure 15 can be enhanced by manipulating the particular surface features of either relief structures 15 or 18. For example, the spacing S, height H1 or width W of the markings 16 can be altered to change the diffractive and/or diffusive effects of the markings 16 on incident light rays 22. In addition, the height H2 and smoothness of the image structure 18 can be changed to increase or decrease the relative reflectivity of the image structure 18.

As shown in FIG. 7, a second image can be created in the security overlay marker 10 by forming an additional internal relief structure 19 in the image relief structure 18.

The relief impressions on the surface of security tamper resistant overlay marker 10 are preferably formed by embossing or debossing the surface of security tamper resistant overlay marker 10 with a patterned die. The application of the patterned die with sufficient pressure on the surface of overlay marker 10 causes the correct pattern of markings 16 and image structure 18 to form on the overlay marker 10. In the preferred embodiment, the die is heated prior to applying pressure to a tamper resistant overlay marker 10 to facilitate the imprinting of a desired relief impression.

Although this particular invention has been described in detail with particular reference to the preferred embodiments as illustrated and described herein, as would be obvious to those skilled in the art after a review of the drawings and

specification, various modifications may be made which are encompassed by the present invention and the scope of the invention is not to be restricted except within the scope and spirit of the appended claims.

What is claimed is:

1. A tamper and counterfeit resistant document comprising:
 - a substrate; and
 - a security tamper resistant overlay marker applied to said substrate, said security tamper resistant overlay marker comprising a first latent image, said first latent image comprising an image relief structure, said image relief structure comprising a flat portion and a ridge portion, said ridge portion comprising a first series of ridges, said flat portion defining a first plane; each of said ridges of said first series of ridges having a top, said tops of said ridges of said first series of ridges defining a second plane, said second plane located above said first plane with respect to said substrate; and
 - a second latent image comprising an internal image relief structure comprising a second series of ridges; said second series of ridges formed in said flat portion of said internal image relief structure, each of said ridges of said second series of ridges having a bottom, said bottom of said ridges of said second series of ridges defining a third plane, said third plane below said first plane with respect to said substrate.
2. The tamper and counterfeit resistant document of claim 1 wherein said ridges of said first series of ridges are substantially parallel to said ridges of said second series of ridges, and wherein said first series of ridges are complementary to said second series of ridges.
3. The tamper and counterfeit resistant document of claim 1 wherein said ridges of said first series of ridges are nonintersecting and said ridges of second series of ridges are nonintersecting.
4. The tamper and counterfeit resistant document of claim 1 wherein said second series of ridges comprise informational content in the form of at least one alpha-numeric character.
5. The tamper and counterfeit resistant document of claim 1 wherein said second series of ridges is specular.
6. The tamper and counterfeit resistant document of claim 1 wherein said security tamper resistant overlay marker comprises a thermoplastic material.
7. The tamper and counterfeit resistant document of claim 1 wherein said security tamper resistant overlay marker comprises a metallic material.
8. The tamper and counterfeit resistant document of claim 1 wherein said security tamper resistant overlay marker comprises a dye, ink or toner receptive material.
9. The tamper and counterfeit resistant document of claim 1 wherein said security tamper resistant overlay marker comprises a glossy coating.

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